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10/025,324	12/18/2001	Koji Hataya	IIDAP23.001AUS	8155

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KNOBBE MARTENS OLSON & BEAR LLP  
2040 MAIN STREET  
FOURTEENTH FLOOR  
IRVINE, CA 92614

EXAMINER

CANTELMO, GREGG

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 05/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/025,324

Applicant(s)

HATAYA, KOJI

Examiner

Gregg Cantelmo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 16-18,20,21 and 23-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-18,20,21 and 23-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. In response to the amendment received February 18, 2005:
  - a. Claims 16-18, 20-21 and 23-28 are pending;
  - b. The 112 rejections have been overcome in light of the amendments to the claims;
  - c. The prior art rejections have been overcome in light of the filing of the certified translation of the foreign priority documents.

### ***Specification***

2. The disclosure is objected to because of the following informalities: the term "phrase" recited in the abstract should be --phase--. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 27 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The original disclosure does not provide a sufficiently specific teaching of the time period (about 80 minutes) set forth in claim 27. Therefore this claim has introduced new matter to the application.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 23 is rejected under 35 U.S.C. 102(b) as being anticipated by WO 99/49531 A (WO '531).

WO '531 discloses a method of making a non-aqueous secondary battery comprising: assembling a negative electrode, positive electrode and separator in to a final battery form (page 7, ll. 23-33 and Example 1), combining an amount of electrolyte solution and monomer, and cross-linking the monomer in the presence of the electrolyte to form a first solid gel portion and second separated liquid portion (page 2, ll. 11-19, page 2, line 32 through page 3, line 13). The method generates a battery product having the same resultant structure in WO '531 as recited in claim 23 (as applied to claim 23). While WO '531 discloses forming the electrolyte before introducing the components into the final battery form, the resultant final structures of the battery of WO '531 and that of instant claim 23 are identical in scope and thus the battery product of WO '531 is held to anticipate the battery of claim 23.

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is

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unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

“The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature” than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

### ***Response to Arguments***

5. Applicant's arguments with respect to claim 23 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 16, 24, 26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO '531 in view of U.S. patent No. 5,223,353 (Ohsawa).

WO '531 discloses a method of making a non-aqueous secondary battery comprising: assembling a negative electrode, positive electrode and separator in to a final battery form (page 7, ll. 23-33 and Example 1), combining an amount of electrolyte solution and monomer, and cross-linking the monomer in the presence of the electrolyte to form a first solid gel portion and second separated liquid portion (page 2, ll. 11-19, page 2, line 32 through page 3, line 13 as applied to claims 16 and 28).

The battery is formed by laminating the various electrodes and separators together (Fig. 1 and Example 1 as applied to claim 24).

The duration of cross-linking, while dependent upon the materials employed, is shown to be within the range of 2 minutes to 2 hours (Example 1 as applied to claim 26).

The difference between claims 16 and 28 and WO '531 is that WO '531 does not disclose a method step of introducing the electrolyte and monomer into the final battery form and thereafter cross-linking the monomer to form the gel/liquid electrolyte as discussed above (claims 16 and 28).

Ohsawa discloses that the formation of polymeric electrolytes can be carried out by direct polymerization on an electrode or separator or within an electric cell (interpreted to be exemplary of a final battery form). It is preferable that the formation be carried out by direct polymerization on an electrode or on a separator, or within an electric cell. More specifically, it is preferable that battery elements such as electrodes and a separator be impregnated with a solid electrolyte formation composition, and the solid electrolyte formation composition be made a viscoelastic material by

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polymerization means such as heating or application of active light rays thereto, so that the formed solid electrolyte and the battery elements are integrated. Each battery element and the solid electrolyte may be integrated with respect to each battery element, but such integration can be applied to the combination of a positive electrode and a separator, the combination of a negative electrode and a separator, and the combination of a positive electrode, a negative electrode and a separator. When the battery elements and the solid electrolyte are integrated in this manner, the reaction at the positive and negative electrodes and the ion transfer can be caused to proceed smoothly, so that the inner resistance of the battery can be significantly reduced (col. 12, ll. 15-44 as applied to claims 16 and 28).

The motivation then for introducing the electrolyte and monomer into the final battery form and thereafter cross-linking the monomer to form the gel/liquid electrolyte is that it integrates the electrodes and electrolyte together which improves the ion transfer of the battery and reduces the inner resistance of the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of WO '531 by introducing the electrolyte and monomer into the final battery form and thereafter cross-linking the monomer to form the gel/liquid electrolyte since it would have integrated the electrodes and electrolyte together, improved the ion transfer of the battery and reduced the inner resistance of the battery.

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8. Claims 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO '531 in view of Ohsawa as applied to claim 16 above, and further in view of U.S. patent No. 6,013,393 (Taniuchi).

The monomers of WO '531 include methacrylates (see page 4, ll. 29-31 and Example 1 as applied to claim 20).

The difference not yet discussed is of the monomer having a molecular weight of 400 or less.

Taniuchi discloses forming gelled lithium electrolytes wherein the monomer employed in the manufacturing process is an acrylate monomer having a molecular weight of less than 1000 (abstract) and further less than 500 (col. 4, ll. 15-28 as applied to claim 17).

In addition, Taniuchi discloses using methacrylate monomers (col. 3, ll. 43-53 as applied to claim 20).

The motivation for providing a low molecular weight acrylate monomer having a weight of less than 500, which is a reasonable suggestion of 400 or less as claimed in the instant application, is that it improves the ionic conductivity, reduces the seepage of liquid electrolyte from the polymer gel and improves the modulus of elasticity of the gel electrolyte.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of WO '531 by providing a low molecular weight acrylate monomer as suggested by Taniuchi since it would have improved the ionic conductivity, reduced the seepage of liquid electrolyte from the



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polymer gel and improved the modulus of elasticity of the gel electrolyte. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

9. Claims 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO '531 in view of Ohsawa as applied to claim 16 above, and further in view of U.S. patent No. 6,372,387 (Kawakami).

The monomers of WO '531 include methacrylates (see page 4, ll. 29-31 and Example 1 as applied to claim 20) which have an inherent single reaction point of functional group reaction site.

The differences not yet discussed are of the monomer being further provided with a polyfunctional cross-linking agent (claim 18) and the cross linking agent comprising ethylene dimethacrylate (claim 21).

Kawakami discloses providing ethylene dimethacrylate as a cross-linker to a methacrylate monomer (Example 2). Dimethacrylates are polyfunctional composition which have 2 functional or reaction points within the cross-linker (as applied to claims 18 and 21)

Use of a polyfunctional cross-linker improves the mechanical strength and heat resistance of the polymer electrolyte.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of WO '531 by adding a

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polyfunctional cross-linker, such as ethylene dimethacrylate, since it would have improved the mechanical strength and heat resistance of the polymer electrolyte. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

10. Claims 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO '531 in view of Ohsawa as applied to claim 16 above, and further in view of U.S. patent No. 6,509,122 (Oyama).

The difference not yet discussed is of or of the ratio of the mass of the electrolytic solution to the monomer to exceed the mass ratio that can be contained in the gel (claim 25).

Both WO '531 and Ohsawa each disclose fabricating the electrolyte in a mixture of solution and monomer, cross-linking to form a polymer gel electrolyte with a second phase of liquid electrolyte disposed in the gel. One of ordinary skill in the art would have found the limitations of claim 25 to have been an obvious relationship between the electrolyte and monomer in order to effectively provide the second phase liquid electrolyte from the excess solution.

In addition, Oyama discloses providing solution to monomer ratios wherein the solution mass ratio is significantly greater than the monomer. This provides for an electrolyte having improved ionic conductivity due to the presence of the additional electrolyte solution.

The motivation for providing the solution mass ratio to be in excess of what the gel phase can contain is to provide for the second phase liquid electrolyte present in the electrolyte of WO '531. Further providing a greater degree of electrolyte solution provides for a gel electrolyte having improved ionic conductivity due to the presence of the second phase liquid electrolyte within the gel phase.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of WO '531 by providing the solution mass ratio to be in excess of what the gel phase can contain since it would have provided for the second phase liquid electrolyte present in the electrolyte of WO '531. Further providing a greater degree of electrolyte solution would have provided for a gel electrolyte having improved ionic conductivity due to the presence of the second phase liquid electrolyte within the gel phase. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

11. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO '531 in view of Ohsawa as applied to claim 16 above, and further in view of U.S. patent No. 6,420,072 (Maruyama).

The differences not yet discussed are of the duration of cross-linking being about 80 minutes (claims 26 and 27).

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As taught by WO '531, the selection of the process conditions for cross-linking is influenced by the materials employed in the cross-linking process (page 7, ll. 15-22).

According to Maruyama, the time for polymerization or gelation is widely varied depending on the temperature, polymerization methods, cross-linking methods and other factors. For example, gamma.-ray irradiation takes less than 1 minute, UV irradiation needs about 1 to about 30 minutes, and heating requires about 10 to about 300 minutes (as applied to claims 26 and 27).

The motivation for selecting the polymerization times is dependent upon various parameters including temperature, polymerization methods, cross-linking methods and components in the mixture. One of ordinary skill in the art would have found selection of the claimed time periods to have been dependent upon such parameters and in optimizing the conditions to effectively polymerize the electrolyte would have found the claimed time ranges to have been reasonably attainable and obvious to said artisan. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

### ***Conclusion***

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (571) 272-1283. The examiner can normally be reached on Monday to Thursday from 9 a.m. to 6 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. FAXES received after 4 p.m. will not be processed until the following business day. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gregg Cantelmo  
Primary Examiner  
Art Unit 1745

gc



April 28, 2005

**GREGG CANTELMO  
PRIMARY EXAMINER**